UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

October 8, 2004

REPLY TO THE ATTENTION OF:

SR-6J

Mr. Thomas Hilbert
Winnebago Reclamation Service, Inc.
Waste Group
2652 Eastrock Drive, Suite 2B
Rockford, IL 61109

Re: Interim Remedial Action Report, Pagel's Pit Superfund Site

Dear Mr. Hilbert:

Enclosed is a signed copy of the *Interim Remedial Action Report* that has been prepared for the Pagel's Pit Superfund site. The report is "Interim" because the groundwater still contains contamination above the goals sought with the remediation.

If you have any questions, please call me (312-886-4746).

Sincerely yours,

Bernard J. Schorle
Remedial Project Manager

Enclosure

cc: John Holmstrom III, William Charles Ltd.
Nola Hicks, USEPA Office of the Regional Counsel (C-14J)

Interim Remedial Action Report

Pagel's Pit Superfund Site

Rockford, Winnebago County, Illinois

September 30, 2004

Prepared by:

Bernard J. Schorle

U.S. Environmental Protection Agency

Approved by:

for Donald J. Bruce

James N. Mayka, P.E.
Chief, Remedial Response Branch 2
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U.S. Environmental Protection Agency

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Interim Remedial Action Report
Pagel's Pit Superfund Site
Rockford, Winnebago County, Illinois

I. Introduction

The property used for operations at the Pagel's Pit site (Winnebago Reclamation Landfill or WRL) that has been named a Superfund site consists of about 100 acres on the west side of Lindenwood Road, south of Baxter Road, about 5 miles south of Rockford, Illinois. The solid waste landfill part of the Superfund site, which is now called the Northern Unit, began operation in about 1972 and ceased accepting solid wastes in 2000 when it reached its permitted capacity; it encompasses about 42.7 acres. The operator of this landfill has obtained permission for a new landfill from the State, which is located south of the Northern Unit and is called the Southern Unit; the Southern Unit is now accepting wastes. It will encompass about 27.5 acres. These two separate disposal units are authorized under a single operating and development permit, Permit No. 1991-138-LF. The Southern Unit, however, is not part of the Superfund site. These two units, the groundwater monitoring wells, and some other features near the site are shown in Figure 1. (It is to be noted that the designations for some of the monitoring wells have changed over the years.)

Municipal refuse and sewage treatment plant sludge have been the primary wastes accepted at the site. Non-hazardous Illinois special wastes (defined in 35 Illinois Administrative Code (IAC) Part 810 as industrial process wastes, pollution control wastes, or hazardous wastes, except as determined pursuant to section 22.9 of the Illinois Environmental Protection Act (415 ILCS 5) and 35 IAC 808) have also been disposed of at the facility.

The site is located in a predominately rural, unincorporated area. It is bounded on the west by Killbuck (or Kilbuck) Creek and on the east by Lindenwood Road. The contaminated groundwater has moved to the west side of Killbuck Creek, thus moving the boundaries of the site beyond the 100 acres mentioned above. Killbuck Creek, a perennial stream, merges with the Kishwaukee River about 2.5 miles northwest of the site. The Kishwaukee River merges with the Rock River about 1.5 miles northwest of the confluence of Killbuck Creek and the Kishwaukee River. The site is located on a topographic high between Killbuck Creek to the west and unnamed intermittent streams to the north and the south. Land use around the site is a mix of agricultural, rural residential, commercial, and industrial.

The Northern Unit is located at a former sand and gravel quarry. It has been sequentially constructed and filled in several sections. Development has generally occurred in an east to west direction, first in the southern half and then in the northern half as filling proceeded westward, but the western portion was the first part to be brought to the final permitted height. The landfill liner was constructed by grading and compacting the base and side walls of the landfill. Asphaltic concrete was installed over the sides and floor and compacted, resulting in a minimum two-inch thick layer. The surface of the asphalt was sealed with a cationic coal tar sealer. This sealed

asphalt liner was covered with eight inches of sand. A network of perforated pipes was installed in the sand on the sloping base. The pipes were connected to manholes where the liquid that drains from the wastes (leachate) is collected. However, most of this original leachate collection system no longer functions. It has been replaced by pumping the leachate from the landfill gas extraction wells, which extend to about the base of the landfill, to a tank on the landfill's property. From there it is pumped through a force main to a sewer connected to the wastewater treatment plant in Rockford. Landfill gas is collected and is presently being flared. This system for landfill gas extraction has been developed over the years, since the discovery in about 1980 that landfill gas was leaking from the waste disposal area.

The Acme Solvent Reclaiming, Inc. site (Acme Solvent site) is located east of the Pagel's Pit site and it is shown in Figure 1. The Acme Solvent site was proposed for the U.S. Environmental Protection Agency's (USEPA's) National Priorities List (NPL) in December 1982 and was placed on the list in September 1983. Part of the remediation of this site has resulted in the installation of a pump-and-treat system with extraction wells that are approximately half-way between the two sites. The purpose of this system is to prevent or minimize the movement of contaminated groundwater from the Acme Solvent site toward the west and southwest. The treated water is discharged into the intermittent stream that passes across the Acme Solvent site and lies north of the Pagel's Pit site, but generally the water infiltrates the ground before it reaches Killbuck Creek.

The Pagel's Pit site was proposed for inclusion on the NPL in October 1984 because the nearby groundwater was found to be contaminated with arsenic, cadmium, and bis(2-ethylhexyl) phthalate. The site was added to the NPL in June 1986.

The USEPA and a few of the potentially responsible parties (PRPs) for this site reached an agreement embodied in an Administrative Order by Consent, with an effective date of October 16, 1986, that required the Respondents to the Order to conduct a remedial investigation (RI) and a feasibility study (FS) at the site. Portions of these studies were carried out by Warzyn Inc., a contractor for the Respondents, and the reports for the remedial investigation and the feasibility study were submitted in March 1991. Additional investigations were later carried out under this AOC and a 1993 Consent Decree.

A Proposed Plan for Operable Unit (OU) 1 was released to the public on April 16, 1991. This Proposed Plan presented a number of alternatives as possible remedies for the problems that had been identified at the Pagel's Pit site. The Proposed Plan also included a description of the remedy preferred by USEPA and the Illinois Environmental Protection Agency (IEPA). The Record of Decision (ROD) for OU 1, in which the remedy selected for the site was described, was signed June 28, 1991.

OU 1 consists of the wastes that have been disposed of at the site and the contaminated groundwater around the waste disposal area and downgradient as far as the plume of contamination extends, but not the contaminated groundwater in the southeast corner of the site. This groundwater in the southeast corner of the site is designated as OU 2.

A Consent Decree, entered on February 11, 1993, was negotiated with several of the PRPs for the

remedial design (RD), remedial action (RA), and operation and maintenance for the remedy selected in the 1991 ROD. This Consent Decree requires the site operator to perform the remedial work and to pay USEPA for some of its past costs. It requires the other PRPs to pay USEPA for some of its past costs and to contribute to a trust fund that was to be used to help pay for the remedial design and the remedial action.

A Proposed Plan for the remedy for OU 2 and for a change in the remedy for OU 1 was released to the public in August 1999. The ROD for OU 2, which also served as a ROD Amendment for OU 1, was signed September 30, 1999. This ROD also stated that the site qualified as of that date for inclusion on the Construction Completion List. USEPA determined that its response at the site was complete because the operator of the landfill was required to complete the remaining construction activity in accordance with its permit. The long-term groundwater monitoring requirements specified in the 1993 Consent Decree were also required under the existing operating permit.

An amendment to the 1993 Consent Decree will be negotiated to cover the changes made by the remedy selections described in the 1999 ROD.

II. Remedies

Because of the unacceptable risk levels determined in the human health evaluation that was done as a part of the remedial investigation, remedies have been developed for the site. The primary concerns identified for the 1991 ROD were vinyl chloride and arsenic in the groundwater. Containment of landfill gas was also identified as a problem. The capping of the landfill and the other measures taken, especially the extraction of leachate and landfill gas, have been done to reduce the release of leachate and landfill gas and prevent possible contact with the wastes, contaminated groundwater, and landfill gas. By lowering the level of the leachate within the landfill, accomplished by pumping out leachate and decreasing the amount of liquid that enters the wastes with the cap, the release of leachate to the groundwater is decreased. With less leachate entering the groundwater (source control) and natural attenuation processes working on the contamination present in the groundwater, there will eventually be a large reduction in the level of contamination in the groundwater.

The remedy that has been selected for the site as a result of the 1991 ROD and the 1999 combination ROD and ROD Amendment consists of the following components:

- a sanitary landfill cover for the waste disposal area;
- leachate extraction and transfer to the local publicly owned treatment works for treatment;
- gas extraction and the use of the gas for fuel or the flaring of the gas;
- monitored natural attenuation with a contingency for the groundwater downgradient of the site, the contingency--an active remediation of the groundwater that would prevent the movement of the contamination downgradient and/or that would remove contamination in the groundwater downgradient of the landfill wastes, whichever is needed--to be used if the control of the contamination coming from the landfill wastes, the control of contamination coming from upgradient of the site, and the natural attenuation processes do not lead to the eventual return of downgradient groundwater to beneficial use or do not

appear to be doing so in a reasonable period of time or the contaminated groundwater becomes an immediate threat to a downgradient water supply;
- deed restrictions that protect the source control measures through restrictions on construction and that prevent contact with contaminated groundwater through well installation restrictions in those areas containing contaminated groundwater, including areas west of Killbuck Creek; and
- site monitoring, including monitoring of the groundwater in the southeast corner, and maintenance of all remedial action components.

The 1991 ROD selected a barrier well system for groundwater extraction along the west side of the site instead of monitored natural attenuation for the downgradient groundwater. The extracted water would be treated on-site by carbon adsorption (Alternative 5) or air stripping (Alternative 6) following pretreatment with a solids filter, with the treated water being discharged to surface water; if necessary, removal of inorganics by treatment would be done prior to the treatment for removal of organics.

III. Construction Activities

The final cover has been constructed in two phases. First, the cover was installed on the western portion (approximately 16.6 acres) of the landfill after the wastes had reached the permitted elevation. This work began in July 1997. The design for this portion of the landfill was approved on August 8, 1997. *Construction Quality Assurance Acceptance Report Pagel Landfill Final Construction, Western Portion*, February 1998, was submitted to the State on February 23, 1998. The report was accepted by the State on June 18, 1998.

The construction of the final cover for the eastern portion (approximately 27.0 acres) of the landfill began in August 2000 after the wastes had reached the permitted elevation in the rest of the landfill. *Construction Quality Assurance Acceptance Report Pagel Landfill Final Cover Construction--Eastern Portion*, September 2001, was submitted in September 2001. This was followed by *Construction Quality Assurance Acceptance Report Pagel Landfill Final Cover Construction--Addendum--Eastern Portion*, February 2002. The reports were accepted by the State in May 2002.

For both portions, the work consisted of the following components:
- a grading layer;
- a 1-foot recompacted clay layer;
- a 40-mil flexible membrane liner;
- a drainage layer;
- a 2.5-foot protective layer;
- a 6-inch topsoil layer with fertilizer, seed, and mulch;
- storm-water terraces, letdowns, ditches, and culverts;
- a leachate extraction (leachate wells and pumps and associated piping) and conveyance system; and
- a gas collection system, including connection to a flare system.

The gas collection and control system (GCCS) includes 35 vertical dual leachate/gas extraction wells, the collection piping network, and leachate storage tanks. The collected gas is presently being directed to a flare. There are gas probes located outside the waste boundary which are monitored. In February 1999 the IEPA issued the landfill a Title V Clean Air Act Permit Program Permit (CAAPP) with air permit ID #201801AAF and site number 2018080001. This permit is subject to the New Source Performance Standards of the CAAPP program.

Additional work on the leachate extraction system became necessary following the finishing of the capping work on the western portion because of problems encountered with the in-well electrical pumps. Due to problems maintaining the electrical pumps at depths of over 100 feet, a new leachate pumping system utilizing air lift pumps was installed in 1999.

During the construction of the cover for the eastern portion of the Northern Unit, a soil methane vacuum system (SMVS) was installed at the east facility boundary, in late October and early November 2000, to provide protection from exposure to landfill gas migrating from the landfill. Migration was expected to increase because the new cover would cut off venting through the intermediate cover at the same time the gas extraction wells were not operating because of the construction activities. This extraction system was discussed in a December 2000 significant permit modification application submitted to the State in December 2000. This modification was approved by the State on April 13, 2001 (Modification No. 15). The system consisted of four extraction wells connected to a 200 cfm blower which vented the gases to the atmosphere.

There were continuing problems controlling landfill gas after the cover construction was completed. A larger capacity system for handling the landfill gas being extracted from the landfill gas/leachate wells (2500 cfm versus the 1000 cfm system being used at the completion of the capping work) was installed in September 2002 to provide the required control of the landfill gas migration. With this change the SMVS was no longer needed.

Additional details about the construction can be obtained from the two construction quality assurance acceptance reports, dated February 1998 and September 2001, and the addendum, dated February 2002.

IV. Chronology of Events

Event	Date
Landfill began operation	about 1972
Site placed as final on the NPL	6/10/86
Administrative Order by Consent for the RI and FS	8/27/86 effective 10/16/86
Record of Decision (ROD) for OU 1	6/28/91
Consent Decree for OU 1 remedial design (RD) and remedial action (RA)	lodged 11/25/92 entered 2/11/93
On-site mobilization for RA began (closure of western portion of landfill)	7/14/97
RA began	8/8/97
Construction quality assurance report for western portion submitted to State	2/23/98

Event	Date
Western portion construction quality assurance report accepted by the State	6/18/98
Record of Decision for OU 2 remedy and OU 1 remedy amendment	9/30/99
Construction completion under CERCLA	9/30/99
Closure of eastern portion of landfill began	August 2000
Construction quality assurance report for eastern portion submitted to State	September 2001
Eastern portion construction quality assurance report accepted by the State	May 2002
Site inspection for the first five-year review	7/18/02

V. Performance Standards and Construction Quality Control

The goal of the remedial action for the Winnebago Reclamation Landfill is to return the usable aquifer downgradient of the landfill to a beneficial use; this assumes that there are no background contaminants that would prevent beneficial use. This requirement for returning the aquifer to beneficial use does not apply to the zone of attenuation; this zone is a volume bounded by a vertical plane at the property boundary or 100 feet from the edge of the unit, whichever is less, extending from the ground surface to the bottom of the uppermost aquifer and excluding the volume occupied by the waste.

Another goal of the remedial action is to control the landfill gas so that the requirements of the Illinois landfill regulations are met.

The construction quality assurance program under which the landfill was closed is covered in the two construction quality assurance acceptance reports and the addendum previously mentioned..

VI. Site Inspection

An inspection of the site was conducted on July 18, 2002 by the remedial project manager and a representative of the landfill operator. The purpose of the inspection was to check the site and look over those things that are not generally reported on. Except for some minor items noted, mainly related to the short time since the last of the cover was installed, the site appeared to be in very good condition.

The primary means of assuring that the remedial action was done acceptably was the documentation done by the construction quality assurance officer and the acceptances of his reports by the permitting authorities of the State of Illinois.

The deed restrictions for the waste disposal area and those areas nearby that were required under the 1991 ROD have been implemented. These restrictions protect the remedy and prohibit use of the groundwater . Still to be implemented are the additional restrictions that are required by the 1999 ROD. These restrictions will prohibit the use of the groundwater in the southeast corner and the property affected west of Killbuck Creek. It is expected that these additional restrictions will be imposed on this property owned by the operator of the landfill when an amendment to the 1993 Consent Decree has been agreed upon.

VII. Operation and Maintenance

The operator of the landfill is required under the terms of the Consent Decree and the requirements of its permit to maintain the property, including the closure work that has been implemented, and to keep the property in compliance with the permit requirements, such as those applicable to landfill gas and contamination of groundwater. The permit requirements also require periodic monitoring of the groundwater.

VIII. Summary of Project Costs

The estimated capital costs, costs for annual operation and maintenance (O&M), and total present net worth costs for the two alternatives chosen in the 1991 ROD are:

Alternative	Capital Costs	Annual O&M Costs	Present Worth
5	$6,240,000	$310,000	$11,000,000
6	5,960,000	248,000	9,800,000

The above estimates are for a non-operator of the landfill performing the work. While negotiating the consent decree, a new estimate for Alternative 6 was developed that was used in determining the amount of financial assurance that would be needed. This estimate was:

Alternative	Capital Costs	Annual O&M Costs	Present Worth
6	$3,000,000	-----	$6,200,000

The 1999 ROD removed the barrier well system and the treatment of the extracted water from the remedy. Although costs were discussed in this ROD, no new estimates for the total remedy were presented.

The capital costs that the landfill operator has provided for the construction of the landfill cover and associated items are:

western portion:	$1,930,000
eastern portion:	2,290,000

It is to be noted that the landfill operator contracted much of the work to others, most to another business unit of the parent company.

During the closure of the landfill, USEPA performed minimal direct oversight of the construction. It was decided to do this because the state required that the landfill operator hire an independent party to oversee the construction and it was felt that it was not necessary to have two parties providing oversight.

The landfill operator has estimated, for the state, that the total of the annual costs for 30 years of

operation and maintenance is $1,650,000.

IX. Observations and Lessons Learned

Although there were some problems encountered during the construction of the cap, the work generally progressed smoothly.

One problem that was encountered was that the use of electrical pumps placed in the leachate wells was not successful. It appeared that the conditions in the wells, probably mostly the elevated temperatures, resulted in failures of the pumps. It has been found that air lift pumps provide much more reliable service.

X. Contact Information

The PRP's main contact was:

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Waste Group
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Rockford, IL 61109
815-381-5646

The USEPA's remedial project manager was:

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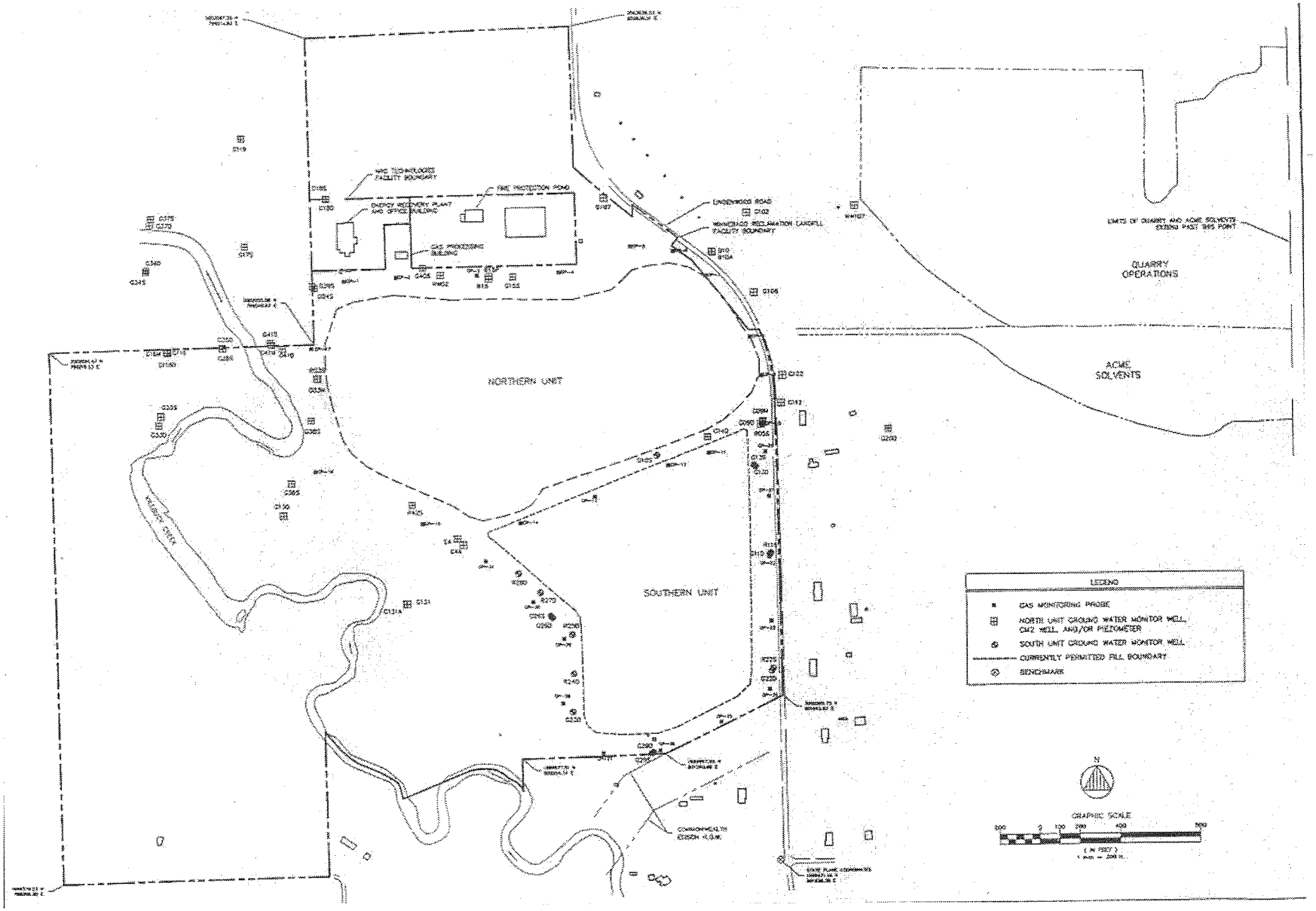

Well Location Map.
(Original from Andrews Environmental Engineering, Inc., dated 12/00, modified 6/01)